INCH POUND

MIL-S-22885/100A
16 May 2003

SUPERSEDING
MIL-S-22885/100 (USAF)
27 August 1982

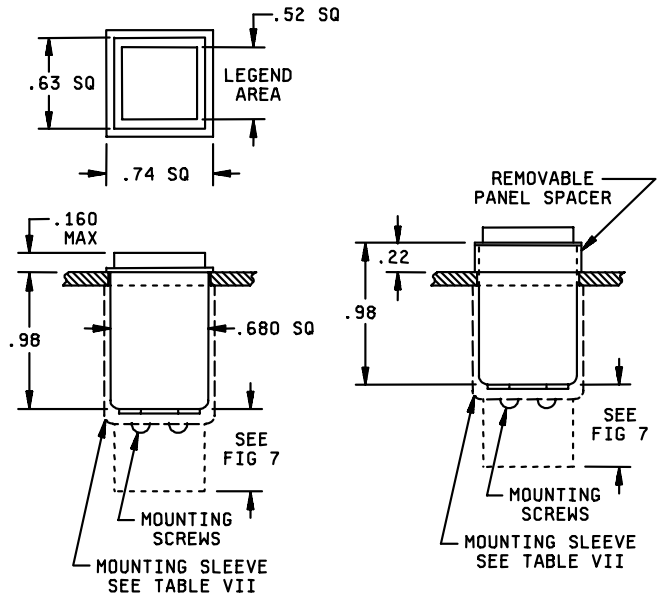
MILITARY SPECIFICATION SHEET

SWITCH, PUSH BUTTON, ILLUMINATED, 4-LAMP, SPDT AND DPDT, 7.5 AMPERES, SILVER CONTACTS, 1 AMPERE, GOLD CONTACTS (DRIPPROOF, SUNLIGHT READABLE, RFI SHIELDED)

Inactive for new design after 21 July 1997, except for replacement purposes.

This specification sheet is approved for use by all Departments and Agencies of the Department of Defense.

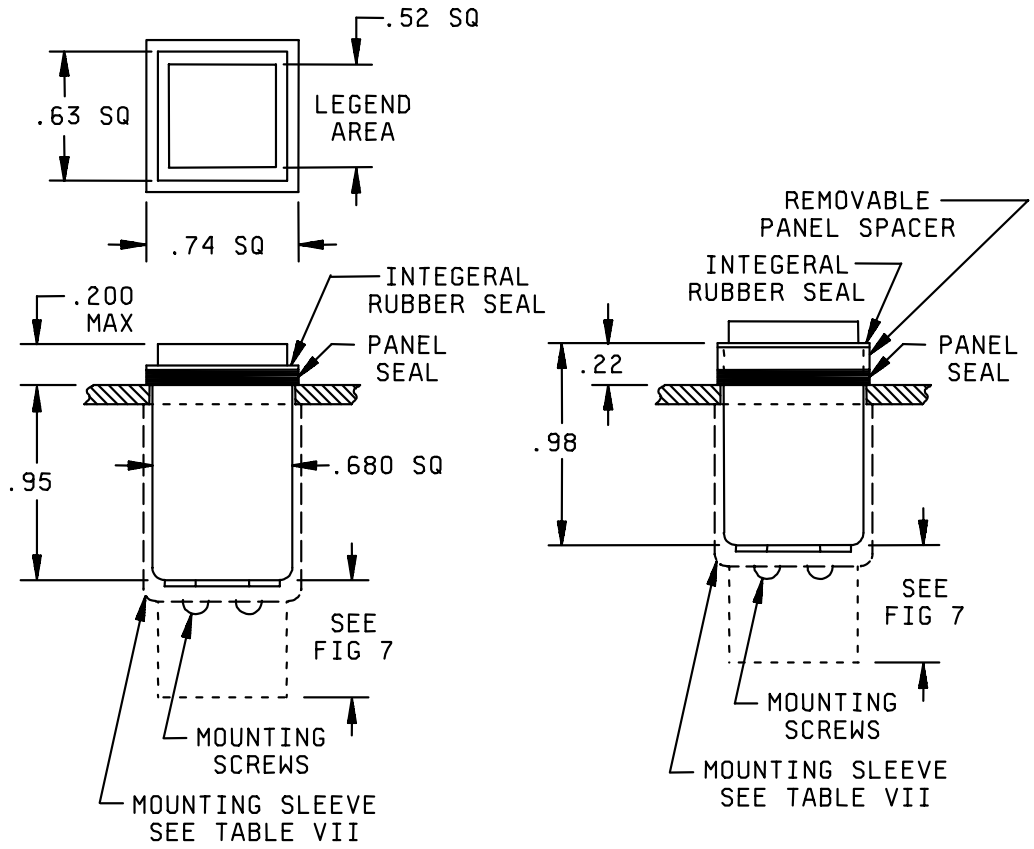
The requirements for procuring the switch described herein shall consist of this specification sheet and MIL-PRF-22885.



Inches	mm
.160	4.064
.22	5.59
.52	13.21
.63	16.00
.680	17.272
.74	18.80
.98	24.89

NOTES:
1. Dimensions are in inches. Metric equivalents are given for general information only.
2. Unless otherwise specified, tolerances are ±.010 for three place decimals and ±.03 for two place decimals.
3. Basic switches shall meet the requirements of MIL-PRF-8805/101.
4. Pushbutton shall be designed to prevent incorrect insertion into switch housing.
5. Pushbutton shall be held captive to switch body by retaining element to prevent accidental interchange.
6. Exact shape of switch optional provided dimensions specified are not exceeded.
7. Terminals and basic switch identification shall be permanently marked.

FIGURE 1. Switch, unsealed (with or without RFI shielding).



Inches	mm
.200	5.080
.22	5.59
.52	13.21
.63	16.00
.680	17.272
.74	18.80
.95	24.13
.98	24.89

NOTES:
1. Dimensions are in inches.
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3. Basic switches shall meet the requirements of MIL-PRF-8805/101.
4. Pushbutton shall be designed to prevent incorrect insertion into switch housing.
5. Pushbutton shall be held captive to switch body by retaining element to prevent accidental interchange.
6. Exact shape of switch optional provided dimensions specified are not exceeded.
7. Terminals and basic switch identification shall be permanently marked as shown.

FIGURE 2. Switch, sealed (with or without RFI shielding).

Inches	mm
.030	.762
.170	4.318
.200	5.080
.670	17.018
.740	18.796
.760	19.304
.890	22.606
.980	24.892

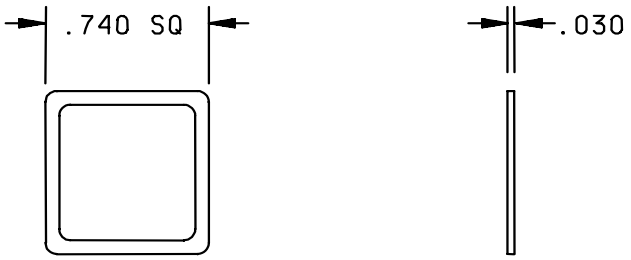


FIGURE 3. Panel seal.

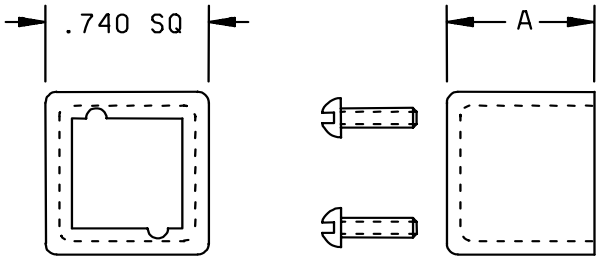


FIGURE 4. Mounting sleeve.

CONFIG CODE	DIM “A”
A	.980
B	.890
C	.760
D	.670

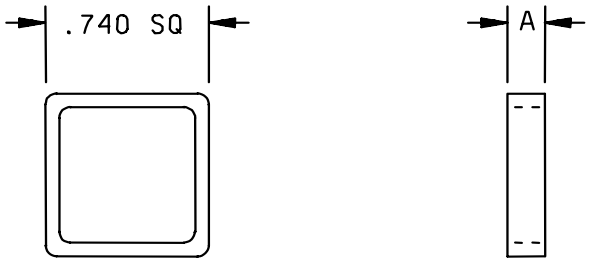
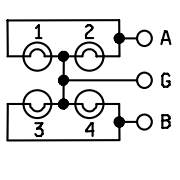
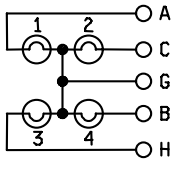
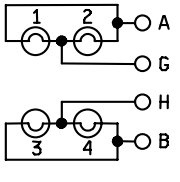
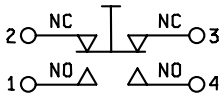
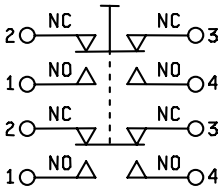


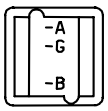
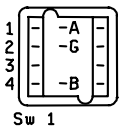
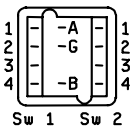
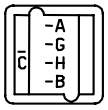
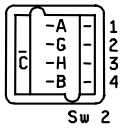
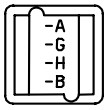
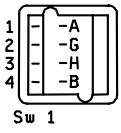
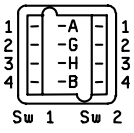
FIGURE 5. Panel spacer.

CONFIG CODE	DIM “A”
C	.200
D	.170

NOTES:
1. Dimensions are in inches.
2. Unless otherwise specified, tolerances are ±.010 for three place decimals and ±.03 for two place decimals.

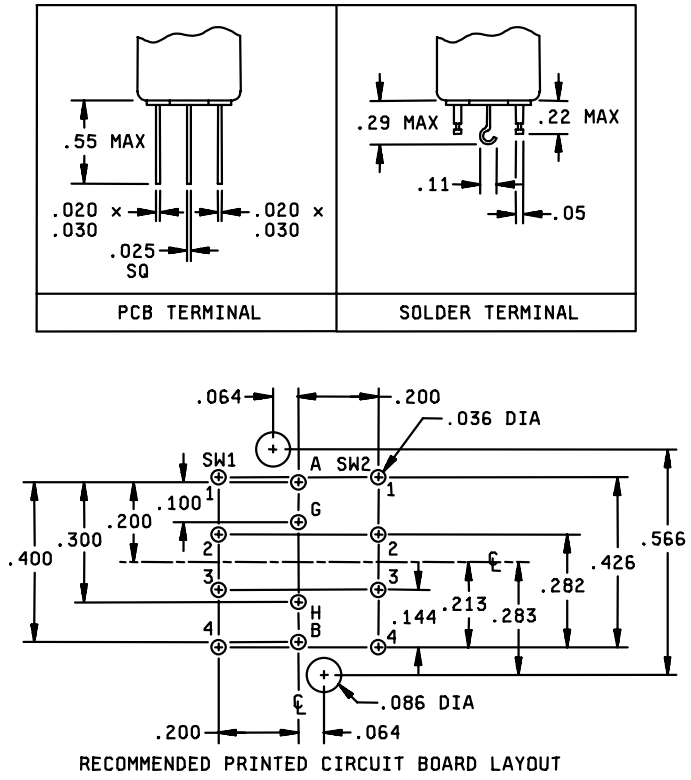
LAMP CIRCUIT		
		
LAMP CIRCUIT 1	LAMP CIRCUIT 4	LAMP CIRCUIT 3

SWITCH POSITIONS - SEE NOTE 1	
SPDT	DPDT
	

TERMINAL IDENTIFICATION (REAR VIEW) SEE NOTE 1		
		
CKT 1 - INDICATOR	CKT 1 - SPDT (MOM/ALT)	CKT 1 - DPDT (MOM/ALT)
		
CKT 4 - INDICATOR	CKT 4 - SPDT (MOM)	
		
CKT 3 - INDICATOR	CKT 3 - SPDT (MOM)	CKT 3 - DPDT (MOM)

1/ Housing shall indicate switch circuit (Sw 1, Sw 2) as required.

FIGURE 6. Circuitry and terminal identification.



Inches	mm
.010	.254
.020	.508
.030	.762
.05	1.27
.07	1.78
.11	2.79
.22	5.59
.29	7.37
.55	13.97
.689	17.500
.750	19.050

RECOMMENDED PRINTED CIRCUIT BOARD LAYOUT

FIGURE 7. Switch and lamp termination.

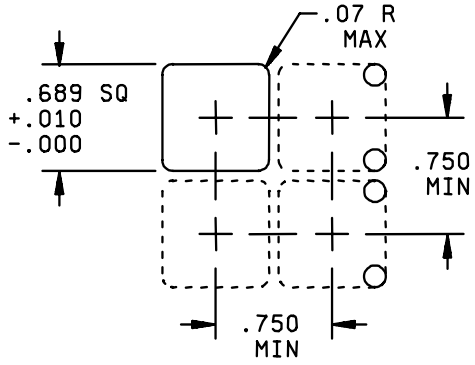


FIGURE 8. Recommended panel cutout.

NOTES:
1. Dimensions are in inches.
2. Unless otherwise specified, tolerances are ± .010 for three place decimals and ± .03 for two place decimals.

REQUIREMENTS:

Dimensions and configuration: See figures 1 through 8

Complete switch shall consist of:

1 - Pushbutton: (MIL-PRF-22885/102) includes front lens and color assembly, lens retainer, divider, integral seal and RFI screen when specified (See table V).
1 - Switch Body: Includes 1 or 2 (MIL-PRF-8805/101) basic switches. Also includes mounting sleeve, panel spacer, panel seal, and mounting screws as specified (See table V and table VII).
4 - Lamps: (T-1 midget-flange base) not included, order separately.

Housing: Aluminum alloy.
Finish: Anodize or chemical film.

Mounting sleeve: Aluminum alloy.
Finish: Anodize or chemical film.

Enclosure design: Unsealed 1.
Dripproof 2.

Weight: 16 grams maximum.

Color and luminance: See table III and table IV.

Temperature characteristic: 1 (-55°C to +85°C).

Vibration grade: 3 (10-2000Hz)

Operating characteristics: Actuation force: 2 to 5 pounds.
Actuation travel: .125 ± .025.

Pushbutton extraction force: 2 to 5 pounds.

Shock: 75 G (method 213, MIL-STD-202, test condition B).

Thermal shock: During high temperature portion of thermal shock test, all four lamps shall be energized with full rated voltage. Total lamp wattage shall not exceed 1.2 watts.

Dripproof test: When specified, test in accordance with MIL-PRF-22885. There shall be no leakage of water through the panel and pushbutton seals as determined by visual examination and the dielectric withstanding voltage test.

Electrical ratings: See table I and table II.

Low level life: Applicable for gold contact switches. 50,000 cycles .

Marking: Per MIL-STD-130.

Part number: M22885/100- (dash number from table V). For acquisition of Government spares, M22885/100- (dash number 501 through dash number 541), MIL-PRF-22885/102, as applicable, shall be used. Provisioning documentation shall show parts breakdown by associated military part number.

RFI shielding: When specified (See table V), switches shall be equipped with an RFI screen. Resistance between the mounting sleeve and the RFI screen shall be measured in accordance with method 307 of MIL-STD-202 and shall not exceed 1 ohm. The following details and exceptions shall apply:

a. Method of connection: Between a suitable exterior point on the mounting surface and the screen (lens may be drilled for access to screen)

b. Test current: 100 ± 10 milliampers.

c. Open circuit test voltage: 6 ± 1 V dc.

d. Number of measurements per activation: One in free position and one in full plunger overtravel position. There shall be no exterior force applied to plunger during measurement of resistance in free position.

e. Number of test activations: One complete cycle of operation with full overtravel.

Sunlight Readability: When specified, the average contrast ratio of each lighted legend character to background shall be 0.6 minimum. The contrast ratio of each unlighted character shall be less than 0.1.

The average contrast ratio of each legend character to the background shall be measured with an incidental illumination of 10,000 foot-candles minimum, at $5,000 \pm 500°$ Kelvin color temperature, directed at an angle of $45° \pm 2°$ to the normal of the viewing surface. Luminance readings shall be point readings taken by a calibrated photoelectric photometer. At least 3 readings shall be taken at equally spaced points on each legend character. The readings shall be averaged provided that the ratio of high-to-low readings shall not exceed 2:1. At least 3 readings shall then be taken at equidistant points in the background immediately adjacent to each character. The background readings shall also be averaged. The contrast ratios, C_L and C_{UL}, shall be calculated for each character.

The ON/BACKGROUND contrast is defined by $C_L = (B_2-B_1)/B_1$

The OFF/BACKGROUND contrast is defined by $C_{UL} = (B_3-B_1)/B_1$

B_1 = Average background luminance

B_2 = Average character luminance, legend illuminated

B_3 = Average character luminance, legend not illuminated

Unless otherwise specified, switch lamps used for testing shall have a calibrated mean spherical candlepower of $.15 \pm .01$. Unless otherwise specified, the following test legend shall be utilized:

REMOTE ALT LOW

TABLE I. Electrical ratings - silver contacts.

Load	Sea Level, 28 V dc	80,000 Feet, 28 V dc
	NO or NC	NO or NC
	(Amperes, max.)	(Amperes, max.)
Resistive	7.5	7.5
Inductive	5.0	3.0
Lamp	1.0	---

TABLE II. Electrical ratings -gold plated contacts.

Load	Sea Level, 28 V dc	80,000 Feet, 28 V dc
	(Amperes, max.)	(Amperes, max.)
Resistive	1	1
Inductive	0.5	0.5

TABLE III. Luminance.

Display Type	Color	Brightness (foot-lamberts) 1/		
		Color code	Without EMI/RFI screen 2/	With EMI/RFI screen 2/
N	Yellow	Y	200	100
	Red	R	50	25
	Green	G	40	20
	White	W	300	150
	Blue	B	25	12
W	Yellow	Y	350	175
	Red	R	70	35
	Green	G	50	25
	White	W	350	175
	Blue	B	30	15
S 3/	Yellow	Y	275	225
	Red	R	185	150
	Green	G	185	150
	White	W	275	225
	Blue	B	185	--- 4/
C	Yellow	Y	350	175
	Red	R	80	40
	Green	G	60	30
	White	W	350	175
	Blue	B	40	20

1/ When illuminated by 4 (T-1 midget-flange base) subminiature lamps of .15 ± .01 mean spherical candlepower (MSCP) at 5 V dc, 2400°K.
2/ Minimum average.
3/ Luminance shall be measured at three points on each legend character and averaged provided that the ratio of high-to-low readings shall not exceed 2:1. The average contrast of each character shall be reported.
4/ Not available in blue.

TABLE IV. Illuminated color limits. 3/

Color	X 1/	Y 1/
Red (R)	.665 .663 .711 .713	SL 2/ .335 .257 SL 2/
Green (G)	.300 .300 .365 .365	.560 SL 2/ .560 .635
Yellow (Y)	.568 .575 .630 .623	.425 SL 2/ SL 2/ .370
Blue (B)	.250 .250 .330 .330	.330 .420 .330 .420
White (W)	.480 .480 .540 .540	.395 .435 .431 .391

1/ The chromaticities of the colors are expressed as “X” and “Y” coordinates on the CIE chromaticity diagram and are within the limits bound by the coordinates listed for each color.
2/ Where intersection occurs with the spectrum locus on the CIE chromaticity diagram.
3/ Chromaticity values are obtained when switch is illuminated by 4 (T-1 midget-flange base) subminiature lamps of .15 ± .01 mean spherical candlepower (MSCP) at 5 V dc, 2400°K.

PART NUMBERS: Part Numbers are assigned as follows:

M22885/100	-007	A	S	2GR
Specification number	Switch Config. (SeeTable V)	Mounting Config. (SeeTable VII)	Display Type (See Table VIII)	Display config. (See Table IX)
	SPDT Momentary switch with silver contacts, PCB termination, Lamp Ckt. 1	Mounting sleeve for .031 - .093 panel thickness	Sunlight readable display pushbutton M22885/102-25	Display code 2: Horiz. split, green color filter top half, red color filter bottom half

TABLE V. Switch configuration dash number.

INDICATOR		MOMENTARY								LAMP CIRCUIT NO. FIG.6	PUSHBUTTON M22885/102- DISPLAY TYPE			
PCB 1/	SLDR 2/	SPDT 3/				DPDT 4/								
		SILVER 8/		GOLD 9/		SILVER 8/		GOLD 9/						
		PCB	SLDR	PCB	SLDR	PCB	SLDR	PCB	SLDR		N	W	C	S
STANDARD SWITCH, NO SEAL, NO RFI SHIELDING														
001	004	007	010	013	016	019	021	023	025	1	01	09	17	25
002	005	008	011	014	017	-	-	-	-	4	01	09	17	25
003	006	009	012	015	018	020	022	024	026	3	02	10	18	26
STANDARD SWITCH WITH SEAL, NO RFI SHIELDING														
035	038	041	044	047	050	053	055	057	059	1	03	11	19	27
036	039	042	045	048	051	-	-	-	-	4	03	11	19	27
037	040	043	046	049	052	054	056	058	060	3	04	12	20	28
STANDARD SWITCH WITH RFI SHIELDING, NO SEAL														
069	072	075	078	081	084	087	089	091	093	1	05	13	21	29
070	073	076	079	082	085	-	-	-	-	4	05	13	21	29
071	074	077	080	083	086	088	090	092	094	3	06	14	22	30
STANDARD SWITCH WITH SEAL AND RFI SHIELDING														
103	106	109	112	115	118	121	123	125	127	1	07	15	23	31
104	107	110	113	116	119	-	-	-	-	4	07	15	23	31
105	108	111	114	117	120	122	124	126	128	3	08	16	24	32
SWITCH BODY ONLY 6/														
501	504	507	510	513	516	519	521	523	525	1				
502	505	508	511	514	517	-	-	-	-	4		5/		
503	506	509	512	515	518	520	522	524	526	3				

See footnotes at end of table.

TABLE V. Switch configuration dash number - Continued.

ALTERNATE								LAMP CIRCUIT NO. FIG.6	PUSHBUTTON M22885/102- 7/ DISPLAY TYPE			
SPDT 3/				DPDT 4/								
SILVER 8/		GOLD 9/		SILVER 8/		GOLD 9/						
PCB	SLDR	PCB	SLDR	PCB	SLDR	PCB	SLDR		N	W	C	S
STANDARD SWITCH, NO SEAL, NO RFI SHIELDING												
027	028	029	030	031	032	033	034	1	01	09	17	25
-	-	-	-	-	-	-	-	4	-	-	-	-
-	-	-	-	-	-	-	-	3	-	-	-	-
STANDARD SWITCH WITH SEAL, NO RFI SHIELDING												
061	062	063	064	065	066	067	068	1	03	11	19	27
-	-	-	-	-	-	-	-	4	-	-	-	-
-	-	-	-	-	-	-	-	3	-	-	-	-
STANDARD SWITCH WITH RFI SHIELDING, NO SEAL												
095	096	097	098	099	100	101	102	1	05	13	21	29
-	-	-	-	-	-	-	-	4	-	-	-	-
-	-	-	-	-	-	-	-	3	-	-	-	-
STANDARD SWITCH WITH SEAL AND RFI SHIELDING												
129	130	131	132	133	134	135	136	1	07	15	23	31
-	-	-	-	-	-	-	-	4	-	-	-	-
-	-	-	-	-	-	-	-	3	-	-	-	-
SWITCH BODY ONLY 6/												
527	528	529	530	531	532	533	534	1				
-	-	-	-	-	-	-	-	4		5/		
-	-	-	-	-	-	-	-	3				

1/ PCB: Indicates printed circuit board pin termination.
2/ SLDR: Indicates solder pin termination.
3/ SPDT: Single pole double throw switch.
4/ DPDT: Double pole double throw switch.
5/ Does not include pushbutton.
6/ For switch body spare parts, order 501 through 534 as required. Does not include mounting sleeve, panel spacer, panel seal, or mounting screws.
7/ Reference Table VIII.
8/ Reference Table I.
9/ Reference Table II.

TABLE VI. Spare part configuration dash number.

DASH NUMBER	DESCRIPTION	
1/	Switch body	
535	Mounting sleeve, Code A, includes 2 mounting screws	3/
536	Mounting sleeve, Code B, includes 2 mounting screws	3/
537	Mounting sleeve, Code C, includes 2 mounting screws	3/
538	Mounting sleeve, Code D, includes 2 mounting screws	3/
539	Panel seal	4/
540	Panel spacer, Code C	5
541	Panel spacer, Code D	5/
2/	Pushbutton	

1/ For switch body spare parts, order 501 through 534 as required.
2/ Refer to MIL-PRF-22885/102 for pushbutton spare parts.
3/ Refer to Figure 4.
4/ Refer to Figure 3.
5/ Refer to Figure 5.

TABLE VII. Mounting configuration.

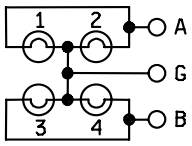
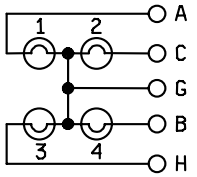
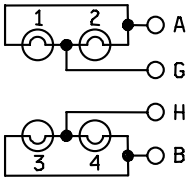
CONFIG. CODE	DESCRIPTION
A	Mounting sleeve for .031 to .093 panel thickness, includes 2 mounting screws.
B	Mounting sleeve for .125 to .187 panel thickness, includes 2 mounting screws.
C	Mounting sleeve for edge lighted panel with .031 to .093 sub-panel thickness, includes panel spacer and 2 mounting screws.
D	Mounting sleeve for edge lighted panel with .125 to .187 sub-panel thickness, includes panel spacer and 2 mounting screws.

TABLE VIII. Display type.

CONFIG. CODE	DESCRIPTION
N	LIGHTED LETTERS: Letters appear white on a black background until illuminated and then letters appear in color, background remains black.
W	LIGHTED BACKGROUND: Letters appear black on a white background until illuminated and then background appears in color, letters remain black.
S	SUNLIGHT READABLE: Letters are not legible until illuminated and then letters appear in color, background remains black. When illuminated, lighted letters are readable in direct sunlight.
C	COLORED BACKGROUND: Letters appear black against a colored background until illuminated and then background appears in lighted color, letters remain black.

TABLE IX. DISPLAY CONFIGURATION

SEE NOTE 2

DISPLAY CODE SEE NOTES 1 AND 3	DISPLAY	AVALABILITY PER LAMP CIRCUIT		
		 CIRCUIT 1	 CIRCUIT 4	 CIRCUIT 3
1X		YES	YES	YES
2XX		YES	YES	YES
3XX		NO	YES	NO
4XXX		NO	YES	NO
5XXX		NO	YES	NO
6XXX		NO	YES	NO
7XXX		NO	YES	NO
8XXXX		NO	YES	NO

1/ Display codes shown are for pushbuttons without color filters. Replace X's with the color symbols of Table IV in sequence shown.
2/ Legends shall be procured separately from a source listed on the qualified products list.
3/ Display codes 3XX through 8XXXX available with lamp circuit 4 only.

QUALIFICATION:

All applicants for qualification approval shall demonstrate that each of their items conform to all the requirements in the applicable documents, singularly and in combination with all the other previously qualified items, regardless of manufacturer.

Group submission: See table X.

TABLE X. Qualification inspection - group submission.

Switch	Qualification Table X of MIL-PRF-22885		Extent of Approval
	Group	Number of Switches	
M22885/100-068BW1W	I	10	
	II	4 (From Group I)	
	III	2 (From Group I)	1 & 2 7/
	VI	2 (From Group I) 1/	(Unsealed
	VII	2 (From Group I) 2/	Dripproof)
M22885/100-123BW1W	I	6	1 & 2 7/
	II	4 (From Group I)	(Unsealed
	VI	2 (From Group I) 3/	Dripproof)
M22885/100-010BN1(X)	VIII 6/	10 (2 of each color)	All
M22885/100-010BW1(X)		10 (2 of each color)	
M22885/100-010BS1(X)		10 (2 of each color) 5/	
M22885/100-010BC1(X)		10 (2 of each color)	
M22885/100-123BW1W	I 4/	2	All
		2	

1/ Test sea level inductive DC load only.
2/ Intermediate current test not applicable.
3/ Test sea level resistive DC load only.
4/ These switches shall be tested for RFI shielding.
5/ Sunlight readable test legend: Remote, Alt Low.
6/ 2 switch bodies only to be used for color and luminance testing.
7/ Enclosure design.

Group A Inspection: Shall be in accordance with Table XI.

TABLE XI. Group A inspection.

Examination or Test	Requirement and Inspection Reference
Visual and mechanical examination	MIL-PRF-22885
Operating characteristics	MIL-PRF-22885
Dielectric withstanding voltage	MIL-PRF-22885
Contact resistance	MIL-PRF-22885

Custodians:
Air Force - 11
DLA - CC

Preparing activity:
DLA - CC

(Project 5930-1763-03)